

Listing of Claims:

What is claimed is:

1. (currently amended) Apparatus for processing an equalizer output signal formed by transmitting an alternate mark inversion input signal over a channel and passing the transmitted signal through an adaptive equalizer, comprising:

4 a correlator circuit block that detects an incorrect convergence of the adaptive
5 equalizer by summing a plurality of consecutive alternate mark inversion symbols and
6 outputs a correlator output signal; and

7 a corrector filter that receives the equalizer output signal and the correlator output
8 signal, and applies a correction to the equalizer output signal based on the correlator
9 output signal, to form a corrected signal that is substantially a time delayed copy of the
10 input signal.

1. (original) The apparatus of claim 1, wherein the correlator circuit block further
2 comprises means for calculating an estimate of an autocorrelation function of the
3 equalizer output signal.

1. (currently amended) The apparatus of Claim 2 Apparatus for processing an
equalizer output signal formed by transmitting an alternate mark inversion input signal
over a channel and passing the transmitted signal through an adaptive equalizer,
comprising:

5 a correlator circuit block, with means for calculating an estimate of an
6 autocorrelation function of the equalizer output signal, that detects an incorrect
7 convergence of the adaptive equalizer and outputs a correlator output signal; and

8 a corrector filter that receives the equalizer output signal and the correlator output
9 signal, and applies a correction to the equalizer output signal based on the correlator
10 output signal, to form a corrected signal that is substantially a time delayed copy of the
11 input signal

12 wherein the autocorrelation function calculating means performs the calculation
13 according to the equation:

$$14 \quad R[m] = \sum_{i=0}^S y[i]y[i - m]$$

15 where R is the estimate of the autocorrelation function, m is an integer which varies from
16 1 to a maximum expected length for an impulse response function of the channel, y is the
17 equalizer output signal, i is an index, and S is a number of iterations used for the
18 calculation.

1 4. (original) The apparatus of claim 3, wherein the corrector filter applies a
2 correction based on a maximum value of R calculated by the autocorrelation function
3 calculating means.

1 5. (original) The apparatus of claim 3, wherein the corrector filter applies a
2 correction based on the equation:

$$3 \quad q[n] = y[n] - y[n - 1] + q[n - M]$$

4 where n is an index, $q[n]$ is the corrected signal, $y[n]$ is the equalizer output signal, and M
5 is the value of m for which R has a maximum absolute value when calculated by the
6 autocorrelation function calculating means.

1 6. (original) The apparatus of claim 2, wherein the autocorrelation function
2 calculating means comprises:

3 a plurality of latches for providing a plurality of delayed equalizer output signals;
4 a plurality of multipliers, each multiplier multiplying the equalizer output signal
5 with a respective one of the delayed equalizer output signals to form a product signal;
6 a plurality of accumulators, each accumulating values of a respective product
7 signal to form a respective sum; and

8 means for identifying which of the accumulators contains a maximum one of the
9 sums.

1 7. (original) The apparatus of claim 6, wherein the plurality of latches are D-type
2 flip-flops.

1 8. (original) The apparatus of claim 6, wherein at least one of the accumulators is a
2 register.

1 9. (original) The apparatus of claim 1, wherein the corrector filter includes an
2 infinite impulse response filter.

1 10. (original) The apparatus of claim 9, wherein the corrector filter includes:
2 a first latch for delaying the equalizer output signal and outputting a delayed
3 signal;
4 an subtractor for subtracting the delayed signal from the equalizer output signal
5 and providing a difference signal;
6 a plurality of additional latches, each delaying the corrected signal by a
7 respectively different number of clock cycles, each additional latch outputting a
8 respective delayed corrected signal;
9 a multiplexer that selects one of the delayed corrected signals; and
10 an adder that adds the difference signal and the selected delayed corrected signal,
11 to form the corrected signal.

1 11. (original) The apparatus of claim 10, wherein the first latch or one or more of the
2 additional latches is a D-type flip-flop.

1 12. (original) The apparatus of claim 10, wherein the correlator output signal is
2 provided to a select input of the multiplexer to select one of the delayed corrected signals.

1 13. (currently amended) A method for processing an equalizer output signal formed
2 by transmitting an alternate mark inversion (AMI) input signal over a channel and
3 passing the transmitted signal through a blind adaptive equalizer, the method comprising
4 the steps of:

5 detecting an incorrect convergence of the blind adaptive equalizer, based on
6 summing a plurality of consecutive alternate mark inversion symbols at the equalizer
7 output signal; and

8 applying a correction to the equalizer output signal, to form a corrected signal that
9 is substantially a time delayed copy of the AMI input signal.

1 14. (original) The method of claim 13 further comprising the step of estimating an
2 autocorrelation function of the equalizer output signal; wherein the correction is based on
3 the estimated autocorrelation function of the equalizer output signal.

1 15. (currently amended) The method of claim 14 A method for processing an
2 equalizer output signal formed by transmitting an alternate mark inversion (AMI) input
3 signal over a channel and passing the transmitted signal through a blind adaptive
4 equalizer, the method comprising the steps of:

5 detecting an incorrect convergence of the blind adaptive equalizer, based on the
6 equalizer output signal;

7 applying a correction to the equalizer output signal, to form a corrected signal that
8 is substantially a time delayed copy of the AMI input signal; and

9 estimating an autocorrelation function of the equalizer output signal; wherein the
10 correction is based on the estimated autocorrelation function of the equalizer output
11 signal

12 wherein the step of estimating the autocorrelation function includes performing a
13 calculation according to the equation:

$$R[m] = \sum_{i=0}^S y[i]y[i - m]$$

15 where R is the estimate of the autocorrelation function, m is an integer which varies from
16 1 to a maximum expected length for an impulse response function of the channel, y is the
17 equalizer output signal, i is an index, and S is a number of iterations used for the
18 calculation.

1 16. (original) The method of claim 15, wherein the correction is based on the
2 maximum calculated value of R .

1 17. (original) The method of claim 15, wherein the correction is based on the
2 equation:

$$q[n] = y[n] - y[n - 1] + q[n - M]$$

4 where n is an index, $q[n]$ is the corrected signal, $y[n]$ is the equalizer output signal, and M
5 is the value of m for which R has a maximum absolute value when calculated by the
6 autocorrelation function calculating means.

1 18. (original) The method of claim 14, wherein the autocorrelation function
2 calculating step includes:

3 providing a plurality of delayed equalizer output signals;

4 multiplying the equalizer output signal with respective ones of the delayed
5 equalizer output signals to form respective product signals;

6 accumulating values of each respective product signal to form a respective sum;

7 and

8 identifying a maximum one of the sums.

1 19. (original) The method of claim 13, wherein the correction applying step includes:

2 delaying the equalizer output signal and outputting a delayed signal;

3 subtracting the delayed signal from the equalizer output signal and providing a
4 difference signal;

5 delaying the corrected signal by a plurality of respectively different numbers of
6 clock cycles, and outputting a respective delayed corrected signals;

7 selecting one of the delayed corrected signals; and

8 adding the difference signal and the selected delayed corrected signal, to form the
9 corrected signal.

1 20. (original) The method of claim 19, further comprising the step of estimating an
2 autocorrelation function of the equalizer output signal, wherein the step of selecting said
3 one of the delayed corrected signals includes selecting said signal based on the estimate
4 of the autocorrelation function.